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With the Compliments of the Author.

Hip-Injuries, including Hip-Joint Disease, and Fractures
of the Femoral Neck, Splint for.

Read before the Philadelphia Academy of Surgery, June 7, 1880,

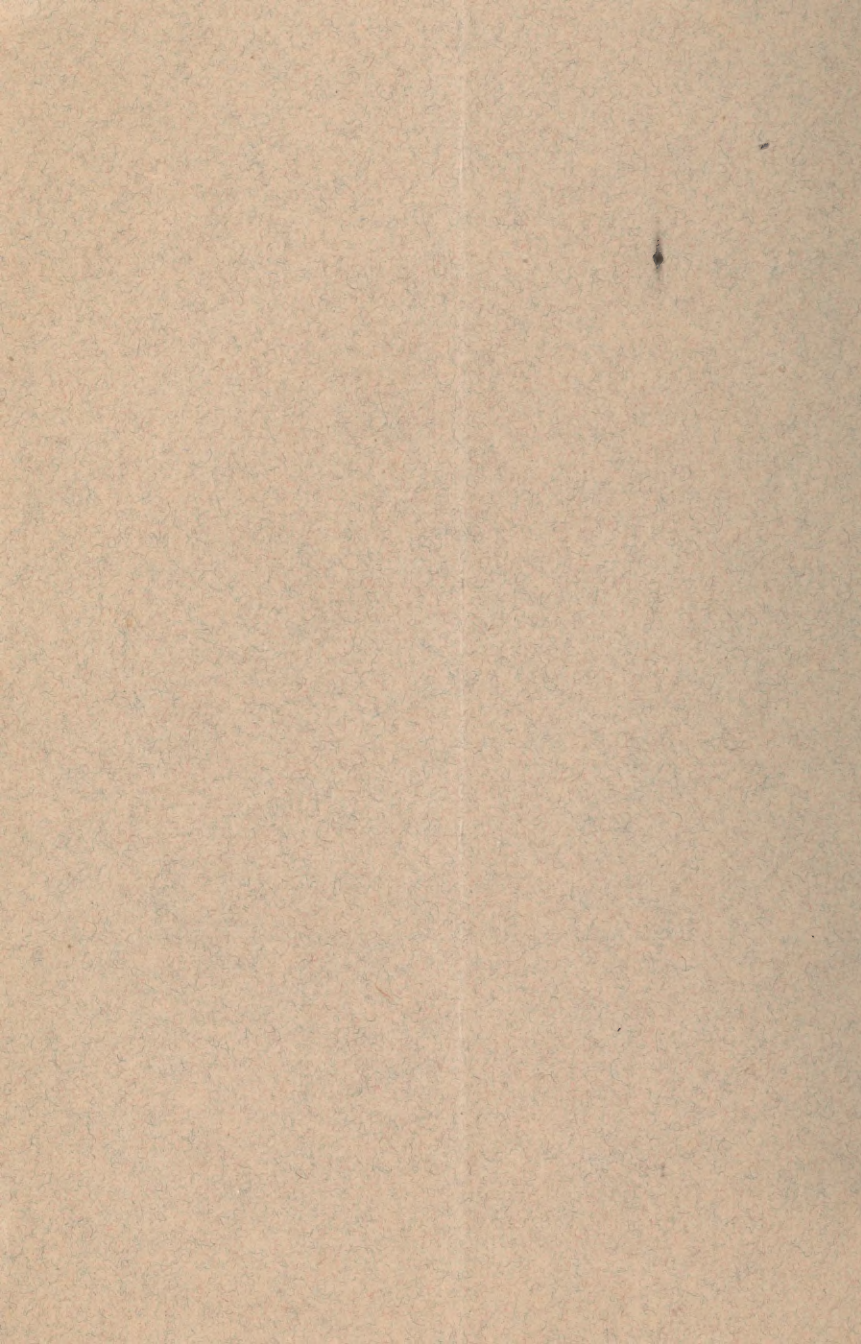
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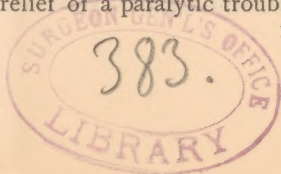
HIP-INJURIES, INCLUDING HIP-JOINT DISEASE, AND FRACTURES OF THE FEMORAL NECK, SPLINT FOR.

I DESIRE, in connection with the exhibition of the accompanying splint, not only to call attention to its adaptability to ununited or badly-united intracapsular fractures of the femur, but also to recommend it as an exceedingly useful support in the disabilities following sprains, lacerations, twists, and dislocations (congenital or traumatic) of the coxo-femoral articulation. Of its use in hip-joint disease, I would say here that it is of the greatest advantage in non-acute cases in the first stage, and in the majority of patients during the other stages.

I have for several years been in the constant habit of fixing this joint in fractures of the upper portion of the thigh, and in all hip-injuries and diseases, by permanent dressings of binders' board, starch, felt, plaster of Paris, silicate of soda, etc., especially in the case of children; but the great inconvenience—in fact, the impossibility—of sitting while encased in one of these dressings, if properly applied,—*i.e.*, so as to embrace the thorax,—did not force itself upon my mind until I was obliged personally to resort to the use of such a dressing for the disability following a laceration of the ligamentum teres caused by a violent twist of the leg.

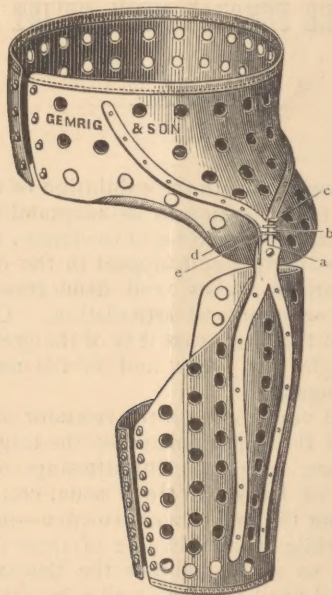
One has but to try the experiment to find that a position other than standing or lying is absolutely incompatible with comfort or the power to pursue any ordinary avocation.

I had often wished to make a joint in my hip-disease dressings, especially in adults who were obliged to attend to business, but, although familiar with the use of leather and felt for spinal dressings, it had not occurred to me to apply them to the hip until I chanced to see a leather apparatus for the relief of a paralytic trouble.



The difficulty with an ordinary jointed splint, however, was that it would not put the hip perfectly at rest; and I accordingly had Mr. Gemrig make me the steel joint which you see here, and which can be locked and unlocked at pleasure, thus rendering the hip perfectly fixed until just at the moment of sitting, when by lifting the bolt (which can be easily done through either a gentleman's or lady's clothing) a perfectly movable joint is secured.

The method of constructing this apparatus is first to make a mould, by plaster of Paris bandages, of the body as high as the



lower angle of the scapulæ behind and the point of the ensiform cartilage in front, in order to secure a firm thoracic support; thence downward, covering in the pelvic region as low posteriorly as the commencement of the internatal crease and anteriorly to the summit of the pubis; thence over hip, buttock, and thigh to a point about three inches above the knee-joint. This mould can be best taken over a light pair of bathing or other closely-fitting drawers. When thoroughly hardened, it is to be slit up, removed, and from it can be made a plaster cast which will be the exact shape of the

individual to be fitted, every point and irregularity being represented.

Upon this cast wet leather is stretched and rubbed and worked until it exactly conforms itself to the surface, when it is allowed to dry *in situ*, the result being a perfect fit.

This leather is so tanned by Mr. Gemrig that, while it is exceedingly light, it is perfectly hard and tough, being much better than sole-leather or raw hide.

The above process, though somewhat costly, gives a most beautifully fitting apparatus, but I believe that, as the splint is to be worn outside of underclothing, a sufficiently accurate splint might possibly be secured by simply applying the wet leather directly to the person of the patient, shaping it, and allowing it to remain in place a short time until it had hardened just enough to retain its conformation, thus avoiding both the plaster mould and the second cast, and saving considerable expense. The first-mentioned plan, however, is by far the better one.

When thoroughly dry, the body and thigh portions are separated, and connected by a joint attached to two spreading steel arms, as seen in the drawing.

This joint must be a strong one, and should be made double,—*i.e.*, not with a simple rivet, but by the same process as is employed in the manufacture of artificial limbs.

In the lower section is a mortise or slot (*a*) into which fits the bolt (*b*), worked (through the clothing) by the head (*c*), and thus perfect fixation is secured.

This bolt slides easily through the eyelets (*d*, *e*), and is retained in its place when lifted by a spring pressing like a finger against its side. The unlocking can be done in a second, during the act of sitting down. The whole splint is perfectly simple and can hardly get out of order. It is to be laced down the front of the abdomen and thigh.

The steel thigh-pieces could be united into one and continued down to the shoe; but, even though this be done, I consider the enveloping thigh-band as one of the essentials for fixation.

The numerous openings (*f*, *g*, *h*) render the apparatus lighter and give slight vent for exhalations. The total weight for a man weighing two hundred pounds is but forty-five ounces.

The joint allows only the hinge-motion, a matter which is of decided advantage in twists or lacerations, and also in hip-disease where the round ligament is involved, as rotary and lateral motions would tend to prevent the needed repair.

To render the apparatus comfortable, it is necessary to cut away certain portions after the patient has worn it, especially the part in

front beneath the ribs and above the groins. This can be narrowed down greatly so as to give comfort in sitting, for as the leather is stiff all necessary support is gained by the broad posterior portion, which embraces pelvis and thorax. The edges can then be padded with curled hair over salient points, and it will be found that greater ease is obtained by taking the weight off the hips by means of suspenders over the shoulders.

When locked, it is surprising how the weight of the body is transferred to the thigh through the medium of the steel without any strain upon the natural joint.

In the disabilities following injury I can testify that it is of the greatest service, and I have also found it of marked benefit as a support in the late treatment of morbus coxarius, enabling fixation or mobility as desired, and so taking off weight from the impaired joint-structures that the crutches can be dropped at a much earlier period than would otherwise be safe.

It is applicable to a large number of hip-disease cases,—*i.e.*, those in whom the inflammatory symptoms are not acute, in either first, second, or third stage. It should always be used, of course, in connection with the plan of crutches, and a high shoe upon the sound foot, thus securing extension. Used in this combination, I believe that it furnishes all the desirable points to be gained in the treatment of this terrible disease, since, while it gives absolute fixation at will, it also allows the patient to go about his ordinary out-door pursuits on crutches and yet to sit at comfort. All hip-disease splints do good chiefly by fixation, and there is not one which is effectual if the weight of the body is thrown upon the limb.

To supply the lacking power of steadying the pelvis upon the thigh in cases of fracture of the femoral neck, and in instances of congenital dislocation of the head of the thigh-bone, I believe this splint offers great hope, although I have not, as yet, had opportunity of testing it, and, of course, the future alone can decide.

